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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/878,123	06/08/2001	Takashi Kumamoto	10559-445001/ P9482X	2371

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EXAMINER

THAI, LUAN C

ART UNIT PAPER NUMBER

2827

DATE MAILED: 06/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/878,123

Applicant(s)

KUMAMOTO ET AL.

Examiner

Luan Thai

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-6,9,10 and 12-31 is/are pending in the application.
- 4a) Of the above claim(s) 13-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6,9,10,12 and 31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

This Office action is responsive to the amendment filed March 03, 2003.

Claims **1-6, 9-10, 12-30 and 31** (newly added claim) are pending in this application.

Claims **13-30** have been withdrawn from consideration as being directed to a non-elected invention.

Claims **7, 8 and 11** have been canceled.

#### ***Claim Objections***

1. Claim 12 is objected to because of the following informalities: in claim 12, the recitation "the layer" should be changed to --said polymer composition--. Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

3. Claims 6 and 9 are rejected under 35 U.S.C. 102(e) as being anticipated by Pannaccione et al. (6,373,125).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claims 6 and 9, Pannaccione et al. disclose (see specifically figure 1) a device comprising: a conductive substrate (13/23); a die (15) having a lower surface that is connected by contacts (7) to the conductive substrate (13/23), and is spaced by a gap from the substrate (13/23); a polymer composition (17) forming a network on a region of the substrate, the network (17) extending at least above the lower die surface and the upper die surface, filling the gap, and imparting sufficient rigidity to the device to maintain integrity of the contacts (7) in the absence of a supporting frame.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaminaga et al. (6,321,734) in view of Farquhar et al. (5,981,312).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claims 1-4, Kaminaga et al. disclose (see specifically figures 1-3) a device comprising: a lead frame having conductive leads (9) and an insulative composition (10) interposed between the leads; a die (1) having a lower die surface that is connected by solder bumps (2) to the leads (9), and is spaced by a gap from a first region of the lead frame; an encapsulant

composition (4) that forms a continuous network that forms a layer extending above the lower die surface, filling the gap, and covering the upper die surface and regions of the lead frame surface that are outside the first region and not occupied by any component, wherein the encapsulant composition (4) extends at least 50% of the distance to an upper surface from the lower die surface (see figures 1 and 3). Kaminaga et al. fail to teach the encapsulant composition being a polymer composition.

Farquhar et al. while related to a similar flip-chip package device teach (see specifically figure 7) that the encapsulant composition (40), which fills the gap between the die (20) and the leads (34), and covers the die (20), is made of polymer composition (Col. 7, lines 30+, Col. 8, lines 28+) in order to improve the method for underfilling and for encapsulating flip chip package (Col. 3, lines 6+). It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the polymer composition, as taught by Farquhar et al., to Kaminaga et al.'s device package in order to improve the method for underfilling and for encapsulating flip chip package.

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kaminaga et al. (6,321,734) and Farquhar et al. (5,981,312) as applied to claim 1 above, and further in view of Hayashida et al. (6,060,768 of record).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claim 5, the proposed device of Kaminaga et al. and Farquhar et al. discloses all the limitations of the claimed invention as detailed above except for the pitch of the leads being less than 0.10 mm.

The pitch of the leads being less than 0.1 mm, however, is conventional in the art as taught by Hayashida et al. (Col. 12, lines 13+). It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the leads in the proposed device of Kaminaga et al. and Farquhar et al.'s device having the pitch to be less than 0.1 mm, as taught by Hayashida et al, for the purpose of improving the density of the leads in a device package.

7. Claims 6 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Azuma (U.S. Patent Application Publication No. 2001/0009301 of record) in view of Farquhar et al. (5,981,312).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claims 6 and 9, Azuma (see specifically figures 14B-16B-17B) discloses a device comprising: a conductive substrate (101); a die (107b) having a lower die surface that is connected by contacts (119) (e.g., solder balls 119) to the substrate, and is spaced by a gap from the substrate; a sealing resin composition (113b) that forms a network on a region of the substrate, the network extending above the lower die surface, filling the gap, and imparting sufficient rigidity to the device to maintain integrity of the contacts in the absence

of a supporting frame (see figures 16B-17B). Azuma does not specifically teach the sealing resin composition being a polymer composition.

Farquhar et al. while related to a similar flip-chip package device teach (see specifically figure 7) that the encapsulant composition (40), which fills the gap between the die (20) and the leads (34), and covers the die (20), is made of polymer composition (Col. 7, lines 30+, Col. 8, lines 28+) in order to improve the method for underfilling and for encapsulating flip chip package (Col. 3, lines 6+). It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the polymer composition, as taught by Farquhar et al., to Azuma's device package in order to improve the method for underfilling and for encapsulating flip chip package.

8. Claims 10, 12 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Juskey et al (6,356,453 of record) in view of Farquhar et al. (5,981,312).

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claims 10, 12 and 31, Juskey et al (see specifically figure 5) a device comprising: a lead frame having plurality of leads (514A-514-515A-515); a die (532) having a lower surface that is connected by contacts (534A) (e.g., solder bumps 534A) to, and is spaced by a gap from a first region of the lead frame; a peripheral component (522) connected to the lead frame (e.g., leads 515A-515) at a location other than in the first region; a sealing composition (536) extending in a direction normal to the lead frame (e.g., leads 514A-514) at least

above the lower die surface, filling the gap between the die (532) and the leads (514A and 514), extending along a surface of the lead frame from the die to the peripheral component (522) and to a perimeter of the lead frame, and encapsulating the peripheral component (522). Juskey et al do not specifically teach the sealing composition being a polymer.

Farquhar et al. while related to a similar flip-chip package device teach (see specifically figure 7) that the encapsulant composition (40), which fills the gap between the die (20) and the leads (34), and covers the die (20), is made of polymer composition (Col. 7, lines 30+, Col. 8, lines 28+) in order to improve the method for underfilling and for encapsulating flip chip package (Col. 3, lines 6+). It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the polymer composition, as taught by Farquhar et al., to Juskey et al.'s device package in order to improve the method for underfilling and for encapsulating flip chip package.

### ***Response to Arguments***

9. Applicant's arguments filed 03/03/03 regarding claims 6-9 have been fully considered but they are not persuasive.

In response to applicant's argument that the reference, US Patent Application Publication No. 2001/0009301 to Azuma, filed on January 23, 2001, is not available as a prior art reference under 35 U.S.C 103(a) as applied to claims 6-9 because the filing date of the parent of the current application



precedes the U.S. filling date of Azuma. The Examiner would like to point out that this application, filed June 08, 2001, is a CIP of Application 09/741,535 and repeats a substantial portion of prior Application No. 09/741,535, filed December 19, 2000, and adds and claims additional disclosures (e.g., devices in figures 3A, 3B, 3C, 3D, 3E, 4A, 4B, 4C, 4D, 5A, 5B, 5C, 6, 7, 8, and claims 6-7-8-9 read on figures 4A, 4B, 4C, and 4D) which are ***not presented in the prior application***. Thus, Azuma is available as a prior art reference as applied to claims 6-9 under 35 U.S.C 103(a) with the filling date (01/23/01) precedes the filling date (6/8/01) of the current application.

#### ***Conclusion***

10. Applicant's arguments with respect to claims **1-6, 9-10, and 12** have been fully considered, but they are deemed to be moot in view of the new grounds of rejection.
  11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action because the changes (e.g., the underlined portions) in claims 1, 2, 6, 9 and 10 raise new issues that would require further consideration and/or search.
- Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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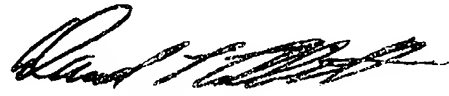
extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luan Thai whose telephone number is (703) 308-1211. The examiner can normally be reached on 7:00 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on (703) 305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Luan Thai  
June 5, 2003

  
DAVID L. TALBOTT  
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